UNITED STATES DEPARTMENT OF ENERGY
OFFICE OF FOSSIL ENERGY

CARBON SEQUESTRATION PROGRAM
PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT

PUBLIC SCOPING MEETING

Taken at:

Bozeman High School
205 North 11th Avenue
Bozeman, Montana
June 8, 2004
7:00 p.m.

ORIGINAL

NORDHAGEN COURT REPORTING
JONNY NORDHAGEN
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A P P E A R A N C E S

FOR THE U.S. DEPARTMENT OF ENERGY:

Dr. Heino Beckert

Scott Klara

FOR POTOMAC-HUDSON ENGINEERING, INC.:

Joe Grieshaber

BE IT REMEMBERED THAT this matter came on for a Public Scoping Meeting on June 8, 2004 at the Bozeman High School.

The following proceedings were had:

DR. BECKERT: Good evening, ladies and gentlemen. The time is now 7 p.m., so let us get started.

This meeting is governed under the National Environmental Policy Act and was arranged by the U.S. Department of Energy as one part of a process to obtain public participation for preparing a detailed environmental review called an Environmental Impact Statement. It will assist the Department of Energy in identifying and prioritizing issues; evaluating potential impacts; establishing the framework for environmental solutions; and defining a program for future research, development, and testing of technologies and methods for the sequestration of carbon dioxide. This is the seventh of eight meetings planned at various locations around the country for this purpose.

The carbon sequestration activities supported by the Department of Energy will help achieve the goals of the Global Climate Change Initiative announced by the President. That initiative will require both development

of a portfolio of technology options with the potential to reduce the carbon intensity of the U.S. economy and establishment of the information base needed by the year 2012 for effective carbon sequestration decisions that balance economic rules and investments in clean-energy technologies.

The implementation of a Carbon Sequestration Program to achieve those goals provides the essence of the basis for the Department of Energy's decision to prepare an Environmental Impact Statement. Your input and comments will be an important part of that effort, so I want to thank you for your attendance tonight.

My name is Heino Beckert, and I'm an employee of the Department of Energy's laboratory in Morgantown, West Virginia.

We have another representative from the Department of Energy here this evening, and he will introduce himself.

MR. KLARA: I'm Scott Klara, with the U.S. Department of Energy.

DR. BECKERT: Assisting with the preparation of the Environmental Impact Statement and with the logistics of this meeting is a team of environmental and administrative specialists led by the Potomac-Hudson Engineering Company, and I would ask a representative from

this company to identify himself.

MR. GRIESHABER: I'm Joe Grieshaber.

Thank you for coming tonight.

DR. BECKERT: We also have a court reporter here to prepare a transcript of this meeting, particularly of your comments, which we will use to document and identify views from the public regarding the scope and content of the environmental analysis.

At the entrance of the meeting room, we provided information regarding tonight's meeting, including a description of the process to prepare the EIS, and of the Department of Energy's current activities and plans related to studies of carbon sequestration.

We have also provided a registration sheet, so I want to encourage you to sign this form. It's a record of your attendance tonight.

Finally, we have provided comment sheets that you can use tonight while following the meeting to submit written comments. Tonight we want your oral comments on the effort to prepare the final analysis of the Carbon Sequestration Program. We will use these comments as well as other comments received by the cutoff date of June the 25th to assist us in preparing the Environmental Impact Statement. The draft of the Environmental Impact Statement when completed will be made available for review

and comment.

What I just read was a prepared statement that we normally do when we begin these meetings to set the tone. It's actually a fairly formal process as far as this goes, and everything we say here tonight is recorded by the court reporter.

Having read this somewhat stilted presentation - I couldn't help it - I'd like to tell you a little bit about the National Environmental Policy Act, also known as "NEPA"; then a little bit about the Environmental Impact Statement in general, and in our case in particular.

"NEPA" is the National Environmental Policy Act. It's a federal law that became effective in January of 1970, and it applies to all federal agencies. NEPA is the cornerstone of environmental review for federal actions and federal projects. It requires that environmental information be made available to public officials and citizens before decisions are made and before the project is initiated. It requires public officials to make decisions based on understanding of the environmental consequences - potential consequences, actually - and to take actions that protect, restore, and even enhance the natural environment.

Right now, we kind of think of these things as a given; in 1970, it was revolutionary. We expect from

this Environmental Policy Act better environmental planning and better decisions by federal officials, resulting from the consideration of high-quality information, accurate scientific analyses, expert agency comments, and public scrutiny. And when you consider this, it's really a handful. It is often very difficult, or somewhat difficult in the best cases, to obtain high-quality environmental information. It takes a lot of time and usually a lot of money.

We need accurate scientific analyses. They have to be independent, and they have to be verifiable.

We also need expert agency comments. Quite often, you have a number of different agencies involved in the EIS. People will contact other experts from other agencies or we invite comments from them.

Last but not least, there's public scrutiny. An Environmental Impact Statement and any NEPA document has to be able to stand public scrutiny. These documents are made available to the public, as we're giving them to you right now. Before we actually start with the environmental documents, we invite comments, we invite the public. Everything is transparent, and everything is supposed to be above board.

NEPA provides information to support recent decisions, decisions based on science and observation, not

on hearsay or on politics. NEPA ensures that the public is involved in the decision-making process regarding a federal project. The public has to be involved. It's a federal project; it is funded by federal money, by taxpayers' money, and the public has to have a say in that.

Public scoping such as we're doing tonight ensures that the NEPA review focuses on issues and potential impacts that are considered important by the public.

What, then, triggers a NEPA review? Any major federal action that has the potential to significantly affect the human or natural environment has to come under NEPA review. It's been the law of the land since 1970. Through the Carbon Sequestration Program, DOE is directly providing resources and funding for the demonstration of technologies of capture and storage of carbon and the reduction of greenhouse gasses.

Any federal action that is wholly or partially funded with federal funds has to be subject to NEPA review. Direct conduct or use of federal resources; same thing.

What, then, is a proposed federal action in this case here tonight? It is the implementation of our Carbon Sequestration Program. Scott Klara will later,

after my talk, present an overview of the Carbon Sequestration Program.

Under this proposed action, DOE would implement efforts as planned under the regional partnerships, continue to support research and development efforts for respective technologies for capture, storage, measurement, monitoring, and verification of carbon sequestration.

We fund commercial-scale demonstration projects, which in their own rights would be subject to NEPA review. And Scott will mention later, I'm sure, the FutureGen concept. And I might as well tell you right now that FutureGen, when the time comes, will be subjected to its own NEPA review. We are not dealing with it here tonight.

The DOE Carbon Sequestration Program is obviously funded by DOE and, therefore, must comply with NEPA. As I said, major federal actions require NEPA review and NEPA compliance.

The nationwide and technology-driven scope of the carbon sequestration activities definitely warrant a Programmatic EIS. The need for broad environmental review at this time is emphasized by the planned evolution of the program from limited field testing to commercial-scale demonstrations. This is truly a major field activity;

therefore, it must undergo NEPA review.

We've been talking about EIS's. What then is an EIS, an Environmental Impact Statement? It's a public document prepared by a federal agency to help officials plan actions and make decisions. The key here is "public document". It is made to be undertaken with public input and is subjected to public review every step of the way. Every time there's a federal action, a major federal action, a major project that has the potential to affect the human or natural environment, we prepare an EIS. The EIS is the highest level of review and the most formal of the environmental documentation under NEPA. They are environmental assessments and they are categorical exclusion documents, which would describe or view projects at a smaller scope and have a lesser chance to affect the environment; and therefore, in all likelihood, would produce less impact.

We are dealing here with a Programmatic EIS. As the name implies, it addresses issues and impacts of a program rather than a specific project. If the Federal Government were to build a power plant on the Ohio River somewhere, no matter what size, it would be a site-specific EIS; it would not be a Programmatic EIS. Site-specific EIS's are by definition more specific. A Programmatic EIS covers the broad aspect of a whole

program.

The nationwide and technology-driven scope of DOE's carbon sequestration activities definitely warrant a Programmatic EIS. In any EIS, you have to describe the proposed action and you also have to describe or list reasonable alternatives to the proposed action. Alternatives which we are likely to consider in our Programmatic EIS are expected to include the no-action alternative. We always have the no-action alternative that asks the question, "What would happen if you didn't do the program, if you don't implement the program?" And in our case, a no-action alternative would limit the program to incur a research and development level that wouldn't enlarge it in any way.

Other alternatives would deal with the modification of schedules for implementation; the variation of the mix of technologies to be considered; the variation in implementation by geographic region, certain geographic regions my favor certain technologies; and also, quite importantly, the elimination of flawed technologies as these developments are being identified in the development of the EIS.

Typically, we analyze any EIS - be it a site-specific one or be it a problematic one - in the following subjects. You can read them here; I don't have

to go through them. You always have most of these if not all of these subjects discussed in the EIS; in other words, what are the potential impacts of implementing the Carbon Sequestration Program all over the country: On the air quality; water resources; fisheries, inland fisheries, and perhaps even coastal fisheries; water quality; land use; waste management; etc., etc.

The Carbon Sequestration Programmatic EIS will then address the full range of environmental issues and potential impacts as they have been identified in the Notice of Intent to Prepare the Environmental Impact Statement. And again, you have copy of it in your handout package.

As identified during the scoping process and exemplified by this meeting here tonight, issues and impacts that have the highest potential for significant impacts will by identified to receive the greatest scrutiny. In other words, if a subject matter is very dear to the people making comments, say they are concerned about air quality or water quality, if we get a lot of comments along those lines, we can certainly put an added emphasis on the analysis of the potential effects of the program on these subjects; air quality and water quality, for instance.

NEPA & the Public Scoping Meeting. This

public scoping meeting is your opportunity to comment on the Carbon Sequestration Program, as will be explained and talked about by Scott in a minute. You will help us identify issues and potential impacts that you consider significant. We want your input. That's part of the scoping process. What are your concerns? What should we consider in preparing this Environmental Impact Statement? This will help steer the program, and it gives you a chance to be included in the decision-making process. To elicit public comments on the nationwide scale, meetings like this have been held in six cities. We have the seventh tonight, and we have another one in Grand Forks, North Dakota. We had meetings in Washington D.C., Columbus, Ohio; Chicago; Houston; Sacramento; and Atlanta. This is the next-to-last meeting that we have.

The balance of this meeting tonight will be conducted as indicated on the slide. After I've finished discussing the NEPA process, I'll introduce Scott Klara to give his presentation, then the floor will be open for comments. Anybody wishing to make a comment is welcome to do so. We will hear the speakers in the order that they signed up out front. If we had a huge crowd here, I would be obliged to say that you have five minutes to make your comments; I think we can make a rare exception to this, and you can talk 10 - 15 minutes, if you want to.

You are requested to state your name clearly and to spell it for the benefit of the court reporter so that we make sure we don't get your names mixed up or misspelled. We would also appreciate it if you would make your comments orally, to come here to the mike and say what you would like to say; and we would also appreciate it if you make your comments in written form so that we have a written record of it. When we write the EIS, we reproduce these comments, and we want to make sure that we don't misquote you or misinterpret anything you say.

This is the Environmental Impact Statement process in rough terms. We are about here -- (indicating.) I don't think we deal with the implementation plan. After the public scoping has been done and we collect all of the information, we have several teams working on the various subject matters and we develop the Draft EIS. The Draft EIS comes out in a year from now, the summer of 2005. After the Draft EIS comes out, we will have a public comment period in probably 120 days, then we have public hearings. We have public hearings in the same place that we have them here for the scoping meetings. Then we produce a final EIS, and then we produce a Record of Decision, which is a codified form, a short version of the EIS. It says what we plan to do, how, where, and why, and gives some of the

legal background, as well.

Methods for Communication of Information: Information about the Programmatic EIS will be made available by way of the Federal Register; DOE points of contact, I am one of those; by way of the DOE Carbon Sequestration website, and you have this in your handout; we also have a carbon sequestration newsletter, which you can receive by signing up on the Web site for or you can contact me. There will be a notice of availability of the draft PEIS to be published in the federal register, and public hearing dates and locations will be announced. And again, the DOE carbon sequestration Web site, a newsletter, newspapers in cities where public hearings will be held, notices issued to federal and state agencies, and notices issued to organizations and individuals requesting them.

It appears that we had some problems with getting the word out for these scoping meetings when we relied solely on newspapers. Sometimes these notices were published and buried in page 16, somewhere where nobody would read it and nobody would find it. We will develop a different technique to do this. We don't exactly know how we're going to do this, but we will definitely have a better way of getting the word out when these meetings will be held.

Organizations and individuals can also request paper copies of the Draft EIS. You have the contact information for the Carbon Sequestration Program and the EIS. This information is also included in your handout. Please note that the scoping phase of the PEIS will be over on the 25th of June. We've got a lot of work to do to complete this Draft EIS, and we have to have a cutoff date, a deadline by which we have to receive those comments. Comments received after the 25th we will consider as much as possible, but we can't guarantee that they will be addressed. Of course, you'll always have an opportunity to make comments again after the draft has been published. There will be a 120-day comment period for you to make your views felt.

This is the end of my talk. Are there any questions I might be able to answer with regard to the NEPA, the National Environment Policy Act; its implications; and perhaps questions on the EIS process?

Yes, sir.

DR. SCHMIDT: Yes. You have a progress review in the year 2012. That seems like a pretty long time off. Why is it that late?

DR. BECKERT: This progress review is not for the EIS. I think Scott will tell us about that. It is the overall compliance of the United States with respect

to overall carbon reduction in concert with the international community. This does not refer to this Programmatic Environmental Impact Statement.

DR. SCHMIDT: I understand, but it still seems kind of late even for that.

DR. BECKERT: Yes, that may be so, but I think it came out of the White House. And I really don't have any influence on that, and I can't answer that.

Are there any other comments or questions? Okay. Then I'll turn it over to Scott.

MR. KLARA: Good evening, everyone. I'll try to speak so I can get above the sound of the machine behind me here. What I'm going to do today is give you a very high-level view of the Carbon Sequestration Program, the Department of Energy, and specifically the Office of Fossil Energy of the DOE.

This slide gives us an overview of the talk for this evening. I'll focus on trying to describe what we consider "sequestration", give you a sense of the fossil energy situation and some greenhouse gas implications, then talk about some possible pathways to stabilization. Then I'll go into the sequestration program, and more specifically a couple of key initiatives: The regional partnerships, FutureGen, and then lastly, I'll finish up and discuss some sources of

information to point you to for additional information.

Let me first describe, at least within our program's context, what we consider "sequestration". Essentially, it's the capture and storage of CO2 and other greenhouse gasses that would otherwise be emitted to the atmosphere.

We look at the capture in terms of two types. We look at direct capture where you capture at the point of emission. A key example of that would be capturing from a power plant.

Another is you could just capture it directly out of the air. And an option that we would pursue for that would be planting trees, things such as that.

Storage locations that are currently being investigated, the primary storage locations are underground reservoirs, primarily oil and gas formations; coal formations; and something called "saline formations" that have a brackish groundwater.

We're also investigating storage in deep oceans. Right now, nobody would consider storage in a deep ocean as a feasible sequestration option at this time because of all of the uncertainties. But certainly, because it's the largest natural sink, it deserves lot of attention in terms of our understanding of how it works.

Converting to solid materials: It is possible

to take carbon dioxide and convert it to rocklike materials called "carbonate", and we are investigating mechanisms that allow us to do that.

And lastly, and I mentioned this a little bit earlier: Forestation and agriculture. We're looking at reforestation of abandoned mine lands, for example; we're looking at re -- putting in grasses; and we're looking at soil carbon and algae as some options for sequestration.

Let me back up and try to give you a sense of the fossil energy picture in the world of the United States and give you some sense of the importance of sequestration relative to these.

This left chart over here shows the energy mix in the United States, showing it at about 86 percent reliant on fossil energy. What this right pie chart shows is a similar data analysis for the world also at 86 percent fossil energy. So right now, roughly 2002 data, the world and the United States is very reliant on the use of fossil fuels. And I'm talking about oil, coal and natural gas.

Now, let's take a look at what's going to happen, at least in the U.S., according to nearly all forecasts over the next 25 years. What you're seeing here is the picture from the previous slide where we have about an 86 percent reliance on fossil energy. What this shows

is the amount of energy that we plan to use and that we used in 2002. Then looking at the forecast from the Energy Information Administration, what you'll see is our reliance still stays in roughly 86 to 87 percent reliance on fossil fuels. But the important note to make here is that the amount of energy we use - a quadrillion Btu per year - goes up by 40 percent. So what that means is without any restraints upon greenhouse gasses, the greenhouse gasses will increase significantly unless some action is performed.

Now, let me try to give you a sense of, "Well, what's all the concern? What's all the hoopla about in regards to these greenhouse gas emissions?" What this chart shows is data over the past several hundred thousand years. This bottom line shows temperature increase or decrease that occurred over that time period. What this top line shows is CO2 concentration in the atmosphere.

One thing I want you to note here over this several-hundred-thousand-year period, note the nice correlation between temperature and CO2 concentration in the atmosphere. Then I want you to look at this section here, which is about the last 150 years from the start of the industrial revolution. The CO2 concentration has increased 30 percent in the last 150 years.

So the big concern here - we have data over

this wide time scale - is that if temperature would follow similar to how it's done for the past several hundred thousand years. So this is really a lot of where the concern comes from in terms of the issue of CO2 and CO2 concentration in the atmosphere, and the potential on temperature, and then climate change.

Let's take a look now at the United States and get a picture of, "What is our greenhouse gas situation?" What you see here is that this pie chart shows all of the anthropogenic or human-induced/man-made greenhouse gas contributors in the United States. What you see here is about 81 percent of it comes from CO2 from energy, essentially from burning of fossil fuels.

Another large component you see is this nine percent methane. And what this represents is fugitive methane emissions from landfills, natural gas distribution system, and coal mines.

The importance of this is relative to the R&D program we're pursuing. The bulk of our R&D focus is on CO2. Another small portion of it focuses on methane, but the primary driver of this data shows where the issues and the problems are.

Let's now take a look at some data on all fossil fuels in various energy sectors. I want to point your attention to this chart. What you'll see here from a

fossil fuel standpoint is: You get a large contribution from oil, no surprise, from the transportation system; a large contribution from coal; and a large contribution from natural gas.

Then I want to point your attention to this, looking at it by sector. You'll see that about 40 percent of the greenhouse gas contribution comes from electricity, 32 from transportation, and 30 is lumped to everything else. The importance of these two to our R&D program is: Right now, we're focusing on large, stationary point emitters. A large portion of our program is focused on coal, and about 90 percent of all coal is used to produce electricity. So you'll see a strong focus in our program on these two issues.

Let me just talk about carbon management options in general. There are really three options. Some people will refer to these as the three legs of the stool or the three corners of the pyramid. They're very high-level options. One is to reduce the carbon intensity. We could go to renewable sources, nuclear, and fuel, switching to lower carbon-based fuels.

Another option is to improve efficiency. That can be done on the demand side; for example, increased vehicle efficiency, increased appliance efficiency. It could also be done on the supply side; for example, power

plants that convert fuel to electricity, we could increase the efficiency there. That would be an important contributor.

The last option here is sequestering carbon, and that's what we're here tonight to talk about.

There was a question earlier about this 2012 time frame, and I'm going to address this here. Hardly a day goes by where you don't hear some comment from a politician about climate change, because of the importance of the issue. From the R&D program standpoint, there's really two very key drivers for the program.

In June of 2001, the National Climate Change Technology Initiative was released by the President. It was the first time that the President in this administration came forward to make a statement on climate change and how we could deal with it. The importance of this initiative - and you don't have to read all that - was to basically say that he believes technology development is going to have to be the solution, and more importantly, recognize that carbon sequestration is going to have to be one of if not the key technology solution to deal with this issue.

The second initiative, which gets toward this 2012 point, there was another key initiative called the "Global Climate Change". It was released on Valentine's

Day in 2002. It was released the same time when something called the "Clear Skies Initiative" was released for criteria pollutants; so as such, I don't believe it got as much attention as it should have. This was another presidential initiative that also recognized the need for technologies to deal with climate change. It mentioned carbon sequestration as the key technology, but also gave some guidance and metrics for us to follow relative to R&D development and implementation. What this guidance was, is that we want to reduce greenhouse gas emissions, via something called the "greenhouse gas intensity", by 18 percent over the next 10 years.

So the President recognized and stated, "We want to slow this growth. We need to start slowing this growth," and then stated that, "We realize, too, that technology today isn't ready for wide-scale deployment to attack this issue." So what we would do is we would do what we can to slow emissions relative to this metric of 2012; and at 2012, we will reevaluate the science at that time, and if it's justified, set a path forward based on this science.

So that's where this 2012 goal comes in, recognizing that most of the technology isn't ready yet. So within our program, what we're trying to do is make sure that by this 2012 timeframe, that we have

commercially ready technologies available for this reassessment process.

Another reason why sequestration gets all the hoopla: Emissions are huge. What this chart shows is worldwide emissions at 6.5 gigatons, billions of tons. Then take a look at, "What if we had to mitigate a large portion of that?"

Let's take a look at some of the sequestration options that are currently being investigated. This will show you terrestrial; coal seams; depleted oil/gas reservoirs; deep saline formations, these are brackish water formations; and the deep oceans. You'll see here a dark bar, which represents lower-case estimates that currently exist; and then a higher-shaded bar, which represents upper-case estimates. The point to take away from this graph is that sequestration potentially will offer decades, if not centuries, worth of capacity for world emissions.

There's another example to drive this point home: There's large, commercial-scale sequestration activity that occurs in the North Sea, the Sleipner Gas Field. It produces methane and has to strip out CO2, and it re-injects a million tons per year. It's estimated that the saline formation that they inject into could hold all of the earth's power plant emissions from 400 to 600

years; huge, huge capacities that exist. That's one reason why sequestration gets so much hoopla. It's one of the few levers we have that can handle that kind of capacity.

Here's another example and illustration of this. What we've done is we've taken a look at a speculative situation of if in the United States we were to try to stabilize emissions at 2002 levels by mid-century, by the 2050 period, what that creates is an emissions gap. That would have to be mitigated to get to that stabilization. Then what we did is we said, "Let's take a look at some of the key options and levers that could be available for us to make that happen."

So we've looked at efficiency and renewables, they have to be a very key component; forestation and agriculture, on the agricultural side, you can have activities such as natural farming; we've taken a look at non-CO2 greenhouse gasses, that's that fugitive methane component; and then these two upper bars are sequestration.

There's a couple of points to take away from this. One is that in nearly all analyses, sequestration has to bear the brunt of the role for stabilization, because the emissions are so, so large. In this analysis, it shows that sequestration would probably have to bear

about 60 percent of this mitigation just to get the United States back to 2002 numbers. Now, that's putting very aggressive assumptions on these other areas.

Another point to make is about the magnitude of these emissions. Don't worry too much about the units, but a 1700 gap would have to mitigated, a million metric tons of carbon equivalent in that year, 1700. A huge power plant might be five. FutureGen will be one -- less than one. So these are huge, huge numbers of emissions to deal with. Therein lies part of the issue in getting to any stabilization scenario, finding the levers that can allow you to make those kind of productions. And sequestration is always key to nearly any analysis because it has to be.

What are the requirements for sequestration? Many of these are very obvious. Environmental is very key. We want to make sure that we leave no legacy for future generations.

There's a lot of activity on the environmental aspects of sequestration. We want to respect and maybe even enhance ecosystems. Terrestrial sequestration is a very nice way to enhance ecosystems. We want to make sure it's safe.

The obvious thing is to make sure there's sudden large discharges. We also have a lot of work

focused on seepage and small-scale leakage and making sure we can spot that and mitigate it.

We want to make sure that it's verifiable.

It's very important that where we put the CO2, whether we plant a tree or if we're putting it underground, that we're able to verify the permanence over time of that CO2 that was sequestered. That's very key to what this concept is all about.

And lastly, we're trying our best to make sure that the methods we develop are economically viable so that we can deal with this issue without bankrupting economies.

To give you a sense of sequestration within the DOE and the government, within DOE, all sequestration activities are coordinated by something called the "Climate Change Technology Program". Within DOE, we have an Office of Science, which performs a lot of the basic research; we then have an Office of Fossil Energy, and that's where this program is located and managed. And the reason that we're going out with this Programmatic Environmental Impact Statement is because we're the program that is most near having the need to demonstrate these technologies at a large scale in the very near future.

Nearly every agency in some shape or form is

looking at sequestration-related activity, and here are just some examples to take with you from these various agencies -- (indicating.) I'll give you two examples: One is the Environmental Protection Agency, a very strong charter on looking at these fugitive methane emissions; another example down here is the United States Department of Agriculture, which very heavily focuses on terrestrial sequestration.

We at the DOE deal with many of these agencies in collaboration. So there are the strong efforts throughout the whole government. Again, I would say that our effort relative to sequestration is the one that is most near the need to get out there and test these things at large scale.

There are a few remaining slides on the program, just keeping it to very high level. I've given you a lot of material here that you're welcome to take with you to give you more detail, and I'll show you some other sources of information at the end here.

We have a core R&D function. It's divided up into capture technologies; sequestration technologies; breakthrough, revolutionary concepts; fugitive methane emissions; something called "measurement, monitoring and verification" which is essentially developing the instrumentation protocols to guarantee the permanence.

We also have something looking at infrastructure, I'll comment about that in a minute; and also a large-scale demonstration that's FutureGen, and I'll describe that again in a minute, as well, to give you an idea, as well. Because both these two areas are the areas that will likely be able to benefit first and foremost from this Environment Impact Statement.

We've established seven regional partnerships in five geographic regions throughout the country. We do have a partnership here called the "Big Sky". There are members of the partnership here who brought some nice materials regarding your partnership. I would encourage you if you have interest in this area to use them as a resource as needed in this area. They're a very key partnership throughout all of our partnerships in the Unites States in trying to deal with sequestration-related issues, and I'll discuss those in a moment.

What are the partnerships all about? Essentially, developing the infrastructures for potential wide-scale deployment. If we had cost-effective technologies today, we couldn't deploy them tomorrow for a variety of reasons. Some of these reasons are baselining regions for sources and sinks. We have a pretty good handle on where most of the sources are. The problem with the sinks, especially the geologic sinks, is that we have

very nice, large maps that will show you where huge reservoirs exist, but very little of that capacity is proven to be safe and effective for sequestration at this time. And we need to do a very good job of finding those and matching those very well, because we can't afford billions of dollars of pipeline to be transporting between sources and sinks.

Another issue is regulatory, environmental, and outreach. With regard to regulation, we put CO2 underground everyday for enhanced oil recovery. We know very well how to deal with that. As soon as you call it "sequestration", you get shrugs. We don't know how to deal with it. Environmental is an obvious one. That's why we're here with this outreach, with this Environmental Impact Statement. Outreach issues and partnerships are very key in helping us get the word out on what sequestration is all about.

Establishing, Monitoring, and Verification Protocols: It's one thing for us to develop technologies like advanced seismic that can take a picture of the reservoir and show you where the CO2 is; it's another thing for us to develop techniques to measure soil carbon to show the development of a tree. What we can't do, what we need protocols for is: How often do you have to take the picture of the reservoir? How often do you have a

forester go out to manage the forest? These are the kind of issues that we're being helped with on the partnerships.

Validating Sequestration: On Phase 2 of the partnerships, they're going to actually be out there helping to validate technology, and more importantly, validate many of these infrastructure issues.

And lastly, determine benefits of the regions: You might say, "Well, what benefits could exist?" Well, you can put CO2 in the ground for sequestration purposes, to enhance oil recovery, enhance gas recovery. There are many benefits with regards to terrestrial sequestration: Reforestation, looking at existing health for forests, etc. Many benefits throughout the country do actually -- can exist relative to sequestration in various regions.

The last initiative I want to talk about is our FutureGen initiative. It's a $1 billion presidential initiative looking at building a coal gasification facility to take coal and convert it to hydrogen and/or electricity. We're going to use the best technology we have coming out of the R&D pipeline to show that we can emit virtually no air pollutants. And more importantly to sequestration, we want to show that it can capture and permanently sequester CO2 on a large level, A billion tons of CO2 per year, is what we're trying to prove from this

field testing.

I'm going to end up with just two slides showing you sources of additional information. I strongly encourage you to use your local regional partnership as a source of information. You can go to our Web site. We maintain a very rigorous Web site - you have this information with you - that you can visit. Not only will it show you information, it will give you a wide variety of contacts. And please feel free to contact people for additional information in this area.

Lastly, we also put up a carbon sequestration newsletter roughly monthly, and this newsletter is free of charge, only requiring that you have an e-mail address. And you don't even have to talk to a person; you can register electronically via the information on this slide here. We would encourage you and you're more than welcome to get this news letter that describes monthly events throughout the world in this area.

That will end my formal presentation. I'll turn it back over to Heino Beckert who will deal with the comment portion and the remainder of the meeting.

DR. BECKERT: Three people, as far as I can tell, have requested to speak. We will call their names in the order in which we received their requests. I have Dr. Hugo Schmidt, Dr. Keith Cooksey, and Ms. Pamela

Tomski. Did anybody else want to make my statements?

Doctor, would you come here to the mike and please give us your comments?

DR. SCHMIDT: Hi, I'm Hugo Schmidt. About half of you know me already, or more. I'm in the Physics Department at Montana State University. I do work on two different DOE grants: One of them with fuel cells, and the other one is an electron transfer grant. But I'm speaking as a private citizen here, and my views shouldn't be construed as MSU or DOE views.

We heard something about carbon dioxide sequestration. And you already heard quite a bit about that, but I summarized before I came to this meeting by saying that there's three challenges: Capturing the CO2 from power plants, industry, home heating, and vehicles is the first one; second is storing the CO2 reliably and "indefinitely", which means forever; and third is capture and storage must be economically feasible. And you heard all of this already from the speakers.

Then Heino mentioned something about alternatives. One alternative, which may be too expensive or maybe it should be a parallel strategy, is a carbon-free hydrogen economy. That's got its own challenges, and may be even more daunting that the sequestration.

The first one is power plants. We've mentioned before power plants, industry, home heating, and vehicles. I'll run through these four in turn. Power plants: Besides the localized power plants that we have mostly, we can have distributed wind and solar to supplement hydro and nuclear, and that would be power plants that don't use any fossil fuel. Then wind and solar aren't available all the time, but if you had distributed hydrogen fuel cells to meet the peak power demand, then you could say that this distributed generation is contributing to the base demand that the power utility faces.

Then, of course, fuel cells can run backwards. There's technical problems. But in principle - and in some cases, in practice - they run backwards to produce hydrogen from the wind or solar power. So that would be distributed generation that helps meet the base load.

Industry; of course, in principle, you could use hydrogen for the fuel, or for heating for industry, you could use some mixture of hydrogen or electric heating or solar thermal heating.

For home-heating, also, you could use a mixture of electric heat and solar thermal heating.

Finally, for vehicles, you can have filling stations, of course, to produce hydrogen to fuel cars and

trucks. And the electric power to produce the hydrogen would come from either the great or local wind or solar power.

Now, Pamela challenged me about an hour ago to make a back-of-the-envelope calculation of how much electric power it takes to make the hydrogen. So I used about two envelopes worth of paper. But it comes to, you know, the average house uses about a kilowatt a day and night if they aren't too careful about, you know, electrical efficiency. And for the vehicles, that family uses - if they were powered by hydrogen produced by electricity - the electricity would amount to about 10 kilowatts day and night.

Now, this is based on assuming that pound for pound, hydrogen isn't any better than gasoline. Maybe pound for pound it is, but I don't know if anybody here knows the answer to that. I'd have to look it up. So there's some uncertainty in that calculation.

And the problem is the cost. The space for these photovoltaic panels - you might say, "Well, we don't want all of these panels everywhere" - but for Montana, for the whole state to power all of the passenger vehicles in the state, you'd need about a six-mile-by-six-mile array of panels, which you could hide out anywhere out in the badlands and nobody would know the difference. But

the cost is another matter. Just the power of electricity for the household - not talking about cars - that would be an investment in photovoltaic panels of about $1,000 a year for 10 years. That's a pretty sizable investment, sort of like a wartime investment like we made in World War II. And then to power the cars, it would be a bigger one. So it's a pretty big challenge.

And why would we want to do that? Well, in Montana, maybe our biggest worry is drought, you know, which goes along with our global warning. And the ocean rising isn't going to affect Montana, but it does the rest of the world. So individual people have to make sacrifices; industry should make sacrifices; and I guess we could say that the government should make sacrifices, but the government comes back to the people, finally, anyway. And these sacrifices may or may not be smaller than those needed for CO2 sequestration. I've heard some optimistic comments tonight that I didn't know about before.

But my final comment is that we can study this, you know, for decades - until 2012, or something like that - but I think the best thing to do is to start now individually. We can all buy our photovoltaic panels. I just ordered four of them from Sunelco the other day for -- I've got PV panels on my house and my rental house.

So my final conclusion is: Let's just not talk about it; let's do it.

DR. BECKERT: Thank you very much for your comments; we appreciate that. Can we get a written copy of that for my records?

DR. SCHMIDT: I've got one for you.

DR. BECKERT: Thank you for your comments.

Our next commenter is Dr. Cooksey, please.

DR. COOKSEY: My name is Keith Cooksey. I'm speaking for myself, and I do work at Montana State University. I have been a DOE contractor in the sequestration program.

One of the slides shown today was injection of carbon dioxide into the ocean fairly close to the float itself. I know there's a lot of research going on as to whether this is a feasible process, but I would like to speak against it. Seventy percent of the oxygen we breathe comes from oceanic photosyntheses, so the very last thing we want to do is to change the way the ocean operates. We would have a lot more problems than global warming if we did cut down our supply of oxygen.

One of the things to make the ocean more productive is it needs fertilization. It needs iron added to it. This is research which is already well known. Fertilizing the sea to make it fix more CO2 is very

similar to a farmer saying, "Well, I planted wheat in this field last year. All I've got to do is fertilize the field this year and hope that I'll get wheat to grow again." That probably wouldn't happen. What you would probably get are weeds growing in the field.

The same things like that would happen in the ocean. You'll facilitate the growth of the organisms that are able to exploit the conditions that you have just set up, and those are not the conditions which existed previously. So whether the organisms that you grow in the ocean to fix CO2 will participate in the food web like the ones that grew there naturally is a question we cannot answer right now. Personally, I don't think it's an answer that we need to look into because there are a lot more ways to fix CO2 than in the ocean.

It's just a small comment. That's all I have to say. Thank you for your attention.

DR. SCHMIDT: Thank you very much, Dr. Cooksey. We appreciate your comments.

MS. CAPALBO: Hi. I'm Susan Capalbo, C-A-P-A-L-B as in "boy"-O. I'm also on the faculty at Montana State University, and I do head up the Big Sky partnership; however, my comments here tonight are as a resident of the state of Montana and not in that capacity.

I have three comments. The first one is more

of an overview comment, and I think Scott addressed this. But personally, I would like to see a real linkage of the outreach and the research that's being done on carbon sequestration to the regulatory issues and the compliance issues. And once again, I think real coordination between EPA and DOE is needed in this area. We can point to numerous examples in the state of Montana. We have perhaps an overabundance of superfund sites in places where some of these concerns have not been adequately addressed. And we have a lot of environmental damages as a result of, perhaps, not carefully thinking through what the long-term consequences are. So I would strongly recommend that kind of collaboration.

My next two comments get down more to what I consider to be some of the needed areas in dealing with the Programmatic EIS. Here in Montana, we have a number of nontraditional communities - Native American communities, rural communities - and I think that we need to have a lot of public outreach into those communities with respect to carbon sequestration. Some of the meetings that you're holding around the states and around the country are not really targeting in getting input from those communities. So one thing you may want to think about is how you could get better input from those communities. And personally, from my experience, you need

to go to those communities. You need to engage those people in the discussions.

And secondly, it relates once again to the nontraditional communities. We don't need to go in and just tell them what the costs and what the benefits are to them; we need to actually engage them. And how are they going to benefit from deploying some of this technology, it that's the case? How are their resources going to be impacted as a result of carbon sequestration or alternative energy sources?

So in the West, we have, as was noted, a real shortage of water; it's a big issue. Native Americans attach of lot of historical and cultural beliefs to these water resources. I think we need to pay careful attention to those concerns. Thank you.

MR. GUTKOSKI: Susan, what does it mean when a coal-fired power plant is a merchant plant free of regulation of the Montana Public Service Commission?

What does that mean: A merchant plant - and I'm talking the about the plant out at Roundup - free of regulation from the Public Service Commission?

Can anybody help me on that?

MS. CAPALBO: You know, I don't know really that, but I'd be happy to get back to you on it in terms of what that means. We're just starting to look into some

of the regulatory compliance issues, both state and interstate issues, with respect to this. And that's a great question. I don't know if anybody else here can answer that.

MR. KLARA: I'm not familiar enough with Montana, specifically, to answer that.

MS. CAPALBO: But I'll get back to you on that. In the next six months, we'll be looking -- working very closely with the Montana Department of Environmental Quality; also, the IOGCC, which is the Interstate Oil and Gas Compact Commissions, and things like that. So if you put your question into the record, I'll work with the people here to try to get that answer.

THE REPORTER: I did get that on the record.

Could I ask you to state your name and spell it, please?

MR. GUTKOSKI: My name is Joe Gutkoski, G-U-T-K-O-S-K-I.

DR. BECKERT: Susan, thank you very much for your comments. Can we get a written summary of your comments? They're very important. These are some of the issues that we'll definitely pay great attention to. When we write the draft and the final EIS, we definitely need those.

MS. CAPALBO: (Nodding head affirmatively.)

DR. BECKERT: Are there any other persons here who would like to make a comment?

Has everybody that is here signed in? We need to keep a record of folks who have been here, if at all possible.

So if there are no commenters tonight, I would like to remind you again of the deadline for submitting any comments. That is the 25th of this month. We would like to have your comments before that time, please.

Also, on the last slide that I showed, I neglected to tell you where my address was given as a contact if you need contact for the Programmatic Environmental Impact Statement progress. If you have access to a computer, I would greatly appreciate any comments or questions via e-mail, if at all possible. This makes it easier for me to keep track of things, to file them, and to pass them on to our contractors who actually work with them and digest them also.

If you don't have access to a computer, send me a regular, snail-mail message. That's also something I can scan into my computer or I can keep a good file on. You can also call me at my office number or the 800-number. Please do not fax me anything because our fax system has taken a hit lately and we don't have enough people working on it, and it's not really a given I would

receive fax messages. But e-mail, surface mail, or by telephone to either my office number or the 800-number would be most welcome.

Does anybody else want to say anything? Then I wish you all safe travel home.

For the record, it is now about three minutes after eight, and I declare this meeting adjourned.

(The Public Scoping Meeting concluded at approximately 8:00 p.m.)

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STATE OF MONTANA)
: ss.
County of Silver Bow)

I, Jonny B. Nordhagen, Court Reporter-Notary Public in and for the County of Silver Bow, State of Montana, do hereby certify:

That this Public Scoping Meeting was reported by me in machine shorthand and later transcribed by computer, and that the foregoing forty-four (44) pages contain a true record, all done to the best of my skill and ability.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my notarial seal this 16th day of June, 2004.

Jonny B Nordhagen

Jonny B Nordhagen
Notary Public for the State of Montana residing at Butte, Montana. My commission expires May 8, 2006.

(NOTARIAL SEAL)